Remarks/Arguments:

Status of the Claims

Claims 1-3 have been cancelled. Claims 4-7 are amended herein. New claim 8 has been added. As a result, claims 4-8 are pending and under examination.

Claim Objections

The Examiner raised the objection that claims 1-3 lacked indentations to separate elements or steps. Claims 1-3 have now been cancelled, but much of claim 3 appears in re-written claim 4. Amended claim 4 contains indentations as required by the Examiner.

Amended claim 4 also specifies that the first aluminum alloy may contain up to 0.05% by weight titanium, which was not specified in claim 3. Support for this additional feature can be found in the alloy of claim 1 and in the description, e.g. page 5, lines 20 and lines 26 to 28.

Claim Rejections – 35 U.S.C. § 112

Claims 3-8 were rejected as indefinite because, in the opinion of the Examiner, the reference to AA3003 is unclear.

The Examiner stated that claim 3 requires the heat exchanger fins to comprise "a second aluminum alloy comprising 0.9 to 1.5% by weight manganese, an alloy of the AA3003 type, and at least 0.5% by weight zinc." However, the claim requires the fins to comprise "a second aluminum alloy selected from the group consisting of an alloy comprising 0.9 to 1.5% by weight manganese and an alloy of the AA3003 type, said second aluminum alloy further containing at least 0.5% by weight zinc." This latter wording is consistent with the Examiner's assessment of the teaching of the description, i.e., "an alloy comprising Mn and an alloy of the AA3003 type, with either having the claimed amount of Zn." Nevertheless, in rewriting claim 4 with the limitations of former claim 3, the wording has been changed simply to:

"... a second aluminum alloy comprising 0.9 to 1.5% by weight manganese and at least 0.5% by weight zinc..."

Hence, the reference to "AA3003 type alloy" has been deleted without any real change of scope because, as can be seen from the attached copy of the entry for alloy AA3003 from The

Aluminum Association's "International Alloy Designations and Chemical Composition Limits for Wrought Aluminum and Wrought Aluminum Alloys" (Exhibit A), AA3003 alloys necessarily contain 1.0 to 1.5% by weight Mn (which falls within the range in the amended claim), and may contain up to 0.10% by weight Zn, but this is increased to at least 0.5% by weight by the requirement of the final part of the original definition. Therefore, the AA3003 alloy (with increased Zn) is merely an example of the second alloy falling within both the original definition of claim 3 and the amended definition of amended claim 4. It is therefore believed that the wording of amended claim 4 is clear in scope and is consistent in scope with original claim 3 and the description as far as the definition of the second aluminum alloy is concerned.

While the reference to AA3003 type alloy has been deleted from amended claim 4, it has now been made the subject of a newly added claim (new claim 9) dependent on claim 4.

Claim Rejections – 35 U.S.C. § 102

Claim 2 was rejected as anticipated by Kawabe et al. Claim 2 has been cancelled, so this rejection is now moot.

Claim Rejections – 35 U.S.C. §§ 102 and 103

Claim 1 was rejected as anticipated by, or in the alternative, obvious over Kawabe et al. Claim 1 has been cancelled, so this rejection is now moot.

Claims 3 to 8 were rejected as anticipated by, or obvious over, Kawabe et al. in view of Koisuka et al.

Claim 3 has been cancelled so the rejection of this claim is now moot.

As noted above, claim 4 has been rewritten as an independent claim including the limitations (with corrected wording) of claim 3. As well as requiring specific alloys for the tubes and fins of the assembly, claim 4 also requires a particular ratio of Mn between the tube alloy and the fin alloy, namely:

Mn_{tube} (wt %) > Mn_{fin} (wt %) - 0.8 wt %.

Regarding claim 4, the Examiner argued that Kawabe et al. disclose ranges of Mn in the tube and fin alloys that may include the above ratios. However, there is no suggestion or teaching in Kawabe et al. showing that such a ratio should be employed or that it would be desirable. The corrosion tests of Kawabe et al. do not discriminate between the Mn content of tubular elements and the Mn content of fin elements, and the claims provide for identical Mn composition ranges for the tubular elements and the fin elements. The claims also provide the same ranges of Mn for the tubes and fins (suggesting similar amounts in both). Thus, the derivation of the ratio required by amended claim 4 is not apparent from Kawabe et al. until knowledge of the present invention is obtained.

It is to be noted that both the tube and the fin alloy of Kawabe et al. must contain 0.05 to 1.0% by weight of Mg (to improve mechanical strength – see column 2, lines 30-32). The tube alloy of the present invention (amended claim 4), however, does not allow for any content of Mg except at the level of impurities (Mg is not one of the listed elements and the balance of the alloy is aluminum and impurities). Thus, in the present invention, Mg may be present only at impurity levels (see Table 1 on page 9 where the amounts of Mg were less than 0.001%; only Alloys F, G, I and J lie within the claimed range – see page 12, line 22). Thus, Kawabe et al. does not anticipate the invention of claim 4 (and therefore dependent claims 5 to 8). It is to be noted that Mg is excluded from the tube alloy of the present invention (except at impurity levels) because the inventors have found that higher amounts of Mg are detrimental when brazing is carried out with NOKOLOK™ flux as in controlled atmosphere brazing methods. Increased Mg levels were also found by the inventors to be detrimental to high temperature flow stress and extrusion pressure which results in lower extrusion speeds and higher costs for extrusions. Therefore, since Kawabe et al. emphasizes the advantages of higher quantities of Mg for improved mechanical strength, a person of ordinary skill in the art would not think of modifying the alloy of Kawabe et al. to exclude Mg. Indeed, Kawabe et al. teach away from the claimed invention, e.g., in column 2 at lines 32 and 33 where it is stated that "A content of Mg below 0.05 wt % is not sufficient to obtain such an effect ..."

Koisuka et al. does not overcome the deficiencies of Kawabe et al. because there is no teaching in this reference of a particular Mn ratio between tube and fin alloys. The Examiner relied on Koisuka et al. merely for its teaching of the composition of alloy AA3003 (Examiner's Detailed Action, page 16, lines 6 to 8 from the bottom). There is nothing to suggest the Mn ratio between tube and fin as claimed in amended claim 4.

The Examiner went on to reject claims 1 and 2 over Bjorneklett et al. in view of Applicant's admissions and Kawabe et al. However, claims 1 and 2 have been cancelled, so this rejection is now moot.

Claim 2 was rejected as anticipated by, or obvious over, Bjorneklett et al. However, claim 2 has been amended, so this rejection is now moot.

Claims 3-8 were rejected as obvious over Bjorneklett et al. in view of Applicant's admissions and Koisuka et al. As noted, claim 3 has been cancelled, so the rejection of this claim is now moot. Regarding claim 4, the Examiner stated that the tubular elements (of Bjorneklett et al.) include an Mn content of 0.7 to 1.5% by weight and the fin members include an Mn content of 0.7 to 1.5% by weight. As with the previous discussion of Kawabe et al., there is no suggestion or teaching in Bjorneklett et al. that the Mn ratio of Applicant's amended claim 4 should be employed or that it is desirable. Again the same range of content of Mn is suggested for both tube and fin alloys, so to derive the claimed Mn ratio from the cited references would require the utilization of hindsight.

Claims 3-8 were also rejected as anticipated by, or obvious over, Bjorneklett et al. in view of Koisuka et al. As noted, claim 3 has been cancelled, so the rejection of this claim is now moot. Regarding claim 4, the Examiner stated that the tubular elements (of Bjorneklett et al.) include an Mn content of 0.7 to 1.5% by weight and the fin members include an Mn content of 0.7 to 1.5% by weight. As noted in the previous discussion of Kawabe et al., there is no suggestion or teaching in Bjorneklett et al. that the Mn ratio of Applicant's amended claim 4 should be employed or is desirable. Again the same range of content of Mn is suggested both for tube and fin alloys, so to derive the required Mn ratio would require the utilization of hindsight.

The Examiner rejected claims 1 and 2 as obvious over Anthony et al. in view of Applicant's admissions and Kawabe et al. However, claims 1 and 2 have been cancelled, so this rejection is now moot.

The Examiner further rejected claims 1 and 2 as anticipated by, or obvious over, Anthony et al. However, claims 1 and 2 have been cancelled, so this rejection is now moot.

The Examiner additionally rejected claims 3-8 as obvious over Anthony et al. in view of Applicant's admissions and Kawabe et al. and further in view of Koisuka et al. As noted, claim 3 has been cancelled, so the rejection of this claim is now moot. Regarding claim 4, the Examiner argued that the tubular elements of Anthony et al. include an Mn content in the core material of 0.2 to 0.8% by weight and in the cladding material of 0.8 to 1.2% by weight, and further the fin members of Kawabe et al. include an Mn content of 0.2 to 1.5% by weight. Therefore, in the Examiner's view, values within these ranges may fulfill the claimed relationship of amended claim 4. However, it is again pointed out that while it may be possible to derive amounts of Mn that satisfy the relationship of Applicant's amended claim 4, there is no suggestion or teaching that such a relationship would in any way be beneficial. Therefore, the subject matter of claim 4 is unobvious and can be derived only with the benefit of hindsight after reading the disclosure of the present invention.

Finally, the Examiner rejected claims 3-8 as obvious over Anthony et al. in view of Applicant's admissions and Kawabe et al. and further in view of Garcia and Koisuka et al. As noted, claim 3 has been cancelled, so the rejection of this claim is now moot. Regarding claim 4, the Examiner stated that the tubular elements of Anthony et al. include an Mn content in the core material of 0.2 to 0.8% by weight and in the cladding material of 0.8 to 1.2% by weight, and further the fin members of Garcia are formed of AA3003 alloy which includes an Mn content of 1.0 to 1.5 wt. %. Therefore, in the Examiner's view, values within these ranges may fulfill the claimed relationship of claim 4. However, it is again pointed out that while it may be possible to derive amounts of Mn that satisfy the relationship of Applicant's claim 4, there is no suggestion or teaching that such a relationship would in any way be beneficial. Therefore, the subject matter of claim 4 is unobvious and can be derived only with the benefit of hindsight after reading the disclosure of the present invention.

Conclusion

For the above reasons, favorable reconsideration and allowance of this application are requested. In the event any issues remain, the Examiner is invited to contact Applicant's legal representatives at the telephone number shown below.

Respectfully submitted,

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SDH/dlm
Enclosure: Exhibit A ("International Alloy Designations and Chemical Composition Limits for Wrought Aluminum and Wrought Aluminum Alloys," The Aluminum Association, Revised February 2009).

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